appeared in NATURE, vol. liii. p. 419) were unequally inflated. Not only can the texture of both of them be satisfactorily made out, but on the right side there is a uniformly tinted hemi-cardiac-shadow, indicative of the greatly thickened right lobe of the liver. Indications of the base of the stomach are also to be made out, and on both sides of the body there are feeble shadows at places coincident with the oviducts.

Messrs. Green and Gardiner have also favoured us with an advanced print of a sciagraph of a *Pelodytes*, which is in some respects sharper than those which they have placed on the market. They are continuing the work, and have recently exhibited before the Linnean and Malacological Societies sciagraphs of molluscs no less successful than those here under review—for they have obtained from the entire *Nautilus* a pictorial record of the muscle scars and lines of origin of the septa (a reprint of which is shortly to appear in the Proceedings of the Malacological Society), and from an entire Chiton of the plate-margins, which lie beneath the body-wall and are of primary taxonomic importance.

Mr. Green is one of our most accomplished zoological lithographers. Recent plates of his, which have appeared in the British Museum Catalogue of Snakes, and in the Proceedings of the Zoological and Malacological Societies, lead us to hope that in some departments of the work he may outrival his foreign contemporaries; and with the Röntgen rays he and his colleague have been no less successful. Their portfolio is elegantly got-up; and its value is materially enhanced by an accompanying introduction, dealing with geographical distribution and structure, from the pen of the distinguished herpetologist whose work incited them to action. We shall watch with intense interest the development of their enterprise, which has already produced results of the greatest service to the student of animal life.

NOTES

THE names of those who attended Prof. Sylvester's funeral, copied from the *Times*, were by inadvertence inserted at the end of Major MacMahon's article, instead of beneath his signature.

M. RADAU has been elected a member of the Section of Astronomy of the Paris Academy of Sciences, in succession to the late M. Tisserand.

SIR JOHN EVANS, K.C.B., Treasurer of the Royal Society, has been elected a Corresponding Member of the Academy of Sciences of Bologna, in succession to the late Right Hon. T. H. Huxley.

PROF. ALBERT VON KÖLLIKER, the eminent professor of anatomy in the University of Würzburg, has had the title of "Excellency" conferred upon him.

DR. LAUDER BRUNTON, F.R.S., will give one of the general addresses at the forthcoming International Medical Congress in Moscow.

PROF. E. RAY LANKESTER, F.R.S., will preside over the meeting of the Museums Association, to be held at Oxford on July 7–9 of this year.

THE ninth meeting of the International Congress of Hygiene and Demography, which was to have been held at Madrid in October of the present year, has been postponed till April 1898.

DR. H. E. ARMSTRONG, F.R.S., has been elected a member of the Athenæum Club, under the rule which empowers the annual election by the Committee of nine persons "of distinguished eminence in science, literature, the arts, or for public services."

A FINE bronze statue of the late Sir Richard Owen has just been placed in the Natural History Museum, South Kensington, facing the statue of Darwin. The funds for the statue were raised by public subscription.

WE regret to have to record the death of Dr. G. A. Kenngott, for many years professor of mineralogy in the University of Zürich, and director of the mineralogical museum there.

A REUTER'S telegram from Ottawa says that the Canadian Government intends to begin immediately the works for enlarging and deepening the canal system in the Dominion, securing a uniform depth of 14 feet from Lake Superior to Montreal, at an estimated cost of 10,000,000 dollars.

ACCORDING to a telegram which the *Lancet* has received from Bombay, the Yersin serum treatment of plague has practically failed. So far the mortality has been 50 per cent. in the selected cases within forty-eight hours of the attack. The hospital mortality is stated to be 60 per cent. in all cases.

IT is now fifty years since Dr. H. C. Sorby, F.R.S., of Sheffield, published the first of his long series of papers. The Literary and Philosophical Society of his native city have determined to celebrate the occasion by having his portrait painted, and have opened a subscription list for the purpose. The treasurer is Mr. A. T. Watson, Assay Offices, Leopold Street, Sheffield.

THE Ottawa correspondent of the *Times* states that reports have been received from Mr. William Ogilvie, a Government Surveyor, who is wintering on the Yukon, in which he speaks of gold discoveries on the tributaries of that river of almost incredible richness. Mr. Ogilvie has taken every means to verify the reports. On one stream three men had washed out 1200 dollars' worth in eight days. The gold-bearing belt is 300 miles long, and well within British territory.

DR. NANSEN delivered a lecture on his Arctic journey, on Saturday evening, at a meeting of the Berlin Geographical Society. After the lecture, it was announced that the Emperor had conferred on him the great gold medal for science and art, "the highest distinction which can be bestowed in Germany for peaceful achievements." Dr. Nansen also received the Humboldt gold medal of the Geographical Society, and was nominated an honorary member of the Society. On Sunday Dr. Nansen lunched with the Emperor at the Royal Castle.

THE British Consul at Chicago, in his report on the trade in his district for the past year, mentions that many goods of German make are finding their way into the Western States, and are taking the place of British goods. Amongst these are chemicals, quinine, ammonia, caustic soda, plate-glass, fuller's earth, Portland cement, cutlery, needles, surgical instruments, paints, and oils.

Science makes a strong protest against some vexatious provisions in the new Tariff Bill now before Congress. The Bill imposes a tax of 45 per cent. *ad valorem* on scientific apparatus "imported especially for colleges and other institutions"; it imposes a tax of 25 per cent. on books imported for public libraries, on books "printed in languages other than English," on books "printed more than twenty years," and on books "devoted to original scientific research"; and it imposes a tax of 25 per cent. on works of art. This simple statement shows that men of science in the United States have abundant cause for complaint against the Bill.

The Cairo correspondent of the *Times* reports that Prof. Forbes, the electrician, who has just returned from Wady Halfa, expresses a highly favourable opinion about utilising the power of the cataracts for generating electricity, and considers the general circumstances of Egypt exceptionally well adapted for its use as motive power. He thinks that the cataract power would be available all the year round for working the railway, cotton ginning mills, sugar factories, irrigation machines, &c., also that it could be supplied over distances of several hundred miles at a cost much below that of coal. Prof. Forbes is now on his way to England. He will return to Egypt in September next, to make a complete survey and present the Government with a project for utilising the electricity to be generated at the Nile cataracts.

The rapidity with which Röntgen photographs can now be taken was exemplified by a series of pictures recently shown by Dr. John Macintyre at the Glasgow Philosophical Society. Dr. Macintyre passed through a kinematograph a film thirty-five feet long, having upon it radiographs of a limb of a frog, and he was thus able to show distinctly to a large audience the movements of the bones in the limb. To obtain the photographs the kinematograph was covered with lead, in which there was the usual aperture. This aperture was covered with black paper. The tube was then put in the best condition, the mercury interrupter being used with a 10-inch spark coil. The movements of the limb of the frog were controlled by a mechanical arrangement.

A short time ago, one of our correspondents ("S. J. R.," Nature, vol. liv. p. 621) described the injurious effects of the X-rays on his hands. He is not the only one, however, that has suffered in this way: several other operators, who have been experimenting with these rays for any length of time, have had either to bear the consequences, or give up for a short time this line of work. An interesting summary and discussion of many of the well-recorded cases of dermatitis due to the X-rays, forms an article in the *Bulletin* of the Johns Hopkins Hospital. The writer, Mr. T. C. Gilchrist, after reviewing the several cases, finds that the X-rays are even more powerful than have been generally thought, and hat the deleterious effects may in some cases be quite serious; the cutaneous manifestations are not, however, the most severe of the lesions, but they are surpassed in severity by those of the deeper tissues, and particularly of periosteum and bones. The discovery of this deeper and more profound effect calls for a new explanation to account for the cutaneous lesions. It seems probable that, according to the writer, these injurious effects may be due to the platinum particles piercing the bulb, and then attacking the tissues. On clinical grounds, he states, there is considerable support for this, at first sight, improbable theory. If the lesion extends at all deeply, it leads to the formation of ulcers, which are extremely intractable, and they may be due to irritating particles still present in the tissues. Mr. Gilchrist advises X-ray operators and experimenters, who develop any special idiosyncrasy, to abstain from their use if they find that the slightest deleterious results follow an exposure to them.

A number of valuable works on botany and other branches of natural history, from the library of the late Mr. Freeman C. S. Roper, were sold by auction last week, the 668 lots realising a total of 1308*l.* 15*s.* Among the more important lots mentioned in the *Times*, with the prices obtained, are the following:—Mr. C. Cooke, "Illustrations of British Fungi," 1881-91, eight volumes, 17*l.* 5*s.*; "The Grete Herbal," printed at Southwarke by P. Treveris, 1526, extremely rare, a sound copy, 39*l.*; a set of the Ray Society publications from the commencement in 1845-1893, 28*l.*; P. A. Saccardo, "Sylloge Fungorum," 1882-96, 27*l.*; the *Journal of Botany* from its commencement in 1863 to 1896, 21*l.*; J. Sowerby, "English Botany," 1790-1863, with the Rev. M. J. Berkeley's appendix volume on British Algæ, 36*l.*; another of the same work, but the third edition, 1863-92, 15*l.* 10*s.*; "Bryologia Europæa," a work on mosses by Bruch, Schimper, and Gümbel, 1836-64, 18*l.* 5*s.*; *Transactions* of the Zoological Society, 1835-95, 43*l.* 10*s.*

The *Daily Chronicle* announces that the preliminary arrangements are now completed for laying across the English Channel two additional telephone cables. The first cable will be laid shortly by the English cable ship *Monarch*, the second being laid by the French Government, for whom it has been constructed in France. The cables will leave the English side of the Channel about three miles to the west of Dover. There are two circuits in each wire; so that, with the cable already laid, there will be six wires available for public use instead of two, as at present, which are in constant use. When the additional cables are duly installed, it is stated that facilities for international telephoning will be given to the large commercial centres in both England and France, instead of confining them to London and Paris only, as at present. When the two new cables are laid, there will be in all about thirty-four wires across the English Channel between St. Margaret's, Dover, on the east, and Beachy Head on the west.

Four hundred years ago the Atlantic was crossed for the first time by Cabot, and a little later Vasco da Gama started on his first voyage to India round the Cape of Good Hope. As the fourth centenary of these epoch-making expeditions will shortly be celebrated in Bristol, Canada and Portugal, an article upon them, by Mr. Edward Salmon, in the current number of the *Fortnightly Review*, appears at the right psychological moment. It is generally believed that Sebastian Cabot was the captain of the English ship which first touched the new continent, but attention is called to Mr. Henry Harrisse's work on "John and Sebastian Cabot," in which it is shown that Sebastian was an impostor who took credit for what his father, John Cabot, did. Furthermore, according to accepted opinion, Cabot struck land at the easternmost point of Cape Breton, but Mr. Harrisse concludes that the first point reached was Cape Chudleigh. John Cabot left Bristol for the voyage west in May 1497, with one small vessel and a crew of eighteen men; Vasco da Gama lef Lisbon, after elaborate preparations, on July 8 in the same year, in charge of three vessels. He arrived at Mozambique in March 1498, and went from there to Melinde. Leaving Melinde he proceeded across the Indian Ocean, and in three weeks arrived in India, whether off Calicut or Cananor is doubtful. A few other interesting points on the voyages of Cabot and Vasco da Gama will be found in Mr. Salmon's opportune article.

The latest issue of the *Izvestia* of the Russian Geographical Society (xxxii. 4) contains a very well-written account, by P. K. Kozloff, of the last portion of Roborovsky's Tibet expedition. While the main body of the expedition was returning from the Nan-shan Mountains, *viâ* Hami, to the Russian post of Zaisan, Kozloff made three very interesting side-journeys across East Tian Shan, and in the adjoining deserts. During one of those journeys he crossed the Kobbe sand desert, which was once visited by Prjevalsky, and lies in the Dzungarian depression, between East Tian Shan and the Altai. The wild camel, the wild horse (*Equus Przewalskii*), and the kulang still live in numbers in the Kobbe desert. As to man, only a few Kirghiz shepherds visit it. From these shepherds, as well as from the inhabitants of the Urungu valley, Kozloff heard about the wild men (*Kyz-kiyik*) who are said to live in that desert; and although the Russian explorer does not much trust to the rich fancy of the nomads, he nevertheless faithfully reproduces what he has learned about the *Kyz-kiyiks* for the use of future explorers. The information runs as follows:—"The size of these men is not smaller than the habitual man's size. Their body is all covered with a short hair of the same colour as in the young camel, black hair falling on the shoulders, and dark eyes; body short and thin, legs relatively long. The *Kyz-kiyik* feeds on roots of plants growing along the streamlets in the sands; moves about in pairs; looks severe, harsh; emits sounds when he is dissatisfied with something, or as a calling signal. When he is pursued, he shouts loudly, and in his shout one hears a whistling sound. The wild man runs very swiftly and walks rapidly, setting his feet wide apart. The Kirghizes whom I spoke to said they had taken *Kyz-kiyiks* alive. The Kirghizes kept them for two or three days in their tents, and tried to feed them with meat and cakes, but they ate nothing; when forced to eat, crossed their hands on the breast, and twinkled with the eyes. They could not bear a steady look, turned the head aside, and on their own will made their hair stand on end. When they were set free, they took at once to the sands, and were joined each time by a comrade, who concealed himself, in the meantime, somewhere in the neighbourhood." The Kirghizes added that it would not be difficult to catch one of them in the winter, but not in summer, as they never have been seen in summer, probably because they conceal themselves in some inaccessible place.

THE opinion that distinct toxins require distinct anti-toxins would appear to require some modification. Dr. Calmette has shown that anti-venomous serum protects against scorpion poison; Roux and Calmette have shown that rabbits vaccinated against rabies, acquire remarkable powers of resisting the action of cobra venom. Again, animals vaccinated against tetanus and anthrax respectively, not only elaborate anti-tetanic and anti-anthrax serum, but such serums have also been found to be in some cases capable of counteracting the effects of cobra venom. Calmette has also shown that anti-diphtheria, anti-tetanus, anti-anthrax, and anti-cholera serums possess decided immunising powers with regard to the vegetable toxin of abrine. Dr. Memmo, working in the Hygienic Institute of the University of Rome, has observed that a distinct, although slight, curative action is produced by anti-diphtheria serum in cases of tetanus. Some extremely interesting investigations by Dr. Marriotti-Bianchi, dealing with the action of normal serums from various sources on different bacterial toxins, also tend to confirm the above observations. Bianchi has also been able to reproduce all the phenomena, claimed by Pfeiffer, to be specific in respect to the behaviour of cholera vibrios in anti-cholera serum, by placing these vibrios in normal serum derived from dogs and cats respectively. It would appear that not only may various anti-toxins modify one and the same toxin, but normal serums may also produce in some cases protection against toxins. This latter point has been specially dwelt upon by Bianchi in his memoir.

A PAPER by Mr. Walcot Gibson, published in the *Transactions* of the Federated Institute of Mining Engineers, will prove useful to all who wish to obtain a clear general notion of the geological structure of the continent of Africa. Written primarily from an economic point of view, a large portion of the paper is naturally devoted to South Africa, for which territory the author pleads the urgent necessity of a thorough geological survey. For the same reason, all beds later than the Karoo receive rather summary treatment, which the pure geologist will regret. The accompanying map, on the scale of about 400 miles to the inch, is very valuable: on it the author has indicated his views on the general correlation of beds throughout the continent. The frequent blanks and queries show how much has yet to be learned of the structure of Africa; but the continual discovery of new facts tends to rapidly throw a map out of date. Even since the preparation of this map, two important additions to our knowledge of African geology have been recorded in the *Geological Magazine*. Dr. Gregory has recorded (from the specimens collected by the Lort-Phillips expedition) the occurrence of Lower Jurassic (Bathonian) rocks, with an Indian fauna, in Somali-land, and has pointed out the bearing of this on the important question of the ancient union of India and Africa. More recently Mr. Draper has found nummulitic limestone on the coast of Gaza-land, and Mr. R. B. Newton, who has identified the nummulites, also records the presence of Upper Cretaceous fossils in the same area.

IN *Das Wetter* for February, Dr. W. Meinhardus, of Potsdam, discusses the possibility of predicting the general character of the weather for some time in advance, based upon the researches of Prof. O. Pettersson, of Stockholm, as to certain relations found to exist between hydrographical and meteorological phenomena. One of the questions dealt with by Prof. Pettersson, is whether the Gulf Stream, or its northern extension, brings the same amount of warmth yearly, or whether variations occur from year to year, and whether any connection exists between its variations and climatic conditions. With this object, he plotted the monthly means of air and sea temperatures for Norwegian stations for twenty years, and found the interesting result that the sea-surface temperature curves for the months December to April, and July to September, exhibit a similar course. A break in the continuity occurs in October and November, and again in May and June, which points to a decided change in the ocean currents at those seasons. The same characteristic is found to exist in the air-temperature in the inland parts of Sweden. From this correspondence of the air with the sea-temperature, and the continuity of the latter through whole groups of months, he concludes that it may be possible to foretell the general character of the weather for a long period in advance. If, for instance, certain conditions are found to exist in the sea-surface temperatures in December, an opinion may be formed of the coming winter and spring. Of course such predictions are quite distinct from those relating to current weather changes, which at present cannot be foretold for more than a day or so in advance. Dr. Meinhardus has extended this inquiry so as to include various stations in Germany, and has plotted the temperature means for thirty-five years. The results confirm those obtained by Prof. Pettersson in a very satisfactory manner. The probability of similar temperature changes in November and December at Christiansund, and in Hamburg, in the following quarter of the year, amounted to 85 per cent., while at inland stations a somewhat less, but still high percentage obtained.

THE address to the South London Entomological and Natural History Society, referred to in last week's NATURE (p. 515), was delivered by Mr. Richard South, the retiring president of the Society.

AN instructive paper on the geology of the Alps, recently read by Prof. T. G. Bonney before the Geologists' Association, appears in the March number of the Association's *Proceedings*. The title of the paper is "An Outline of the Petrology and Physical History of the Alps."

THE first number of a new journal, the *Zeitschrift für Criminal-Anthropologie*, has just appeared. The contents include articles on Lombroso and criminal anthropology of to-day, crime and mind disease, the handwriting of criminals, and a report on the proceedings of the fourth international congress of criminal anthropology, held last August at Geneva. There are also notes on current literature, and reviews of books which come within the scope of the journal. The general editor is Dr. Walter Wenge, and the publisher is A. Priber, Berlin

Judging from the very interesting paper on "The First Crossing of Spitsbergen," in the April number of the *Geographical Journal*, Sir W. Martin Conway's forthcoming book will be an attractive as well as instructive contribution to geographical and geological literature. The general results of the expedition, of which Sir Martin Conway was the leader, have already been described in these columns (vol. liv. p. 437, 1896), and some idea will have been gained of their value from many points of view, particularly on account of the flood of light they throw upon vexed problems of glacial geology. Many remarkably fine illustrations of glaciers and moraines, and a large sketch map of part of Spitsbergen, accompany Sir Martin Conway's paper.

A memoir, by Mr. Alexander McAdie, on the "Equipment and Work of an Aero-physical Observatory," has been published as No. 1077 of the Smithsonian Miscellaneous Collections. The memoir was awarded honourable mention and a bronze medal, in the Hodgkins Fund Prize Competition. The subjects discussed are the known properties of atmospheric air considered in their relationships to research in every department of natural science, and the importance of a study of the atmosphere considered in view of these relationships. Mr. McAdie also points out the proper direction of future research in connection with the imperfections of our knowledge of atmospheric air, and the conditions of that knowledge with other sciences.

For the past eleven years Prof, H. G. Seeley, F.R.S., has, through the medium of the London Geological Field Class, done much to impart a practical knowledge of the physical geography and geology of the Thames district. Nature must be looked in the face if her character is to be understood; and it is to give students an opportunity of thus viewing her directly, while her physiognomy is read, that the Class was founded. The teaching is given by Prof. Seeley during excursions made on Saturday afternoons, between the beginning of May and the middle of July. The twelfth annual course will commence on May 1, with an excursion to Leith Hill. Particulars of this and other excursions may be obtained from the honorary secretary, Mr. R. Herbert Bentley, 43 Gloucester Road, Brownswood Park, South Hornsey, N. All London students of the elements of geology should take advantage of the systematic course of teaching in the open country offered by the London Geological Field Class.

Mr. S. G. Newth, of the Royal College of Science, has invented a little instrument for use in the detection of potassium compounds by the flame test, in the place of the indigo prism. Owing to the fact that indigo transmits the red rays given by lithium, strontium, calcium and barium compounds, as well as the red of potassium, salts of those metals, when heated in a Bunsen, while the flame is examined with an indigo prism, are mistaken for those of potassium. Mr. Newth's instrument, however, not only absorbs the green and yellow portions of the spectrum, but also the red, very nearly as far down as the potassium line, and quite beyond the red lines of lithium, strontium, calcium and barium. It is therefore opaque to the red light given by these metals, while being transparent to the red light of potassium; and it thus allows of the certain detection of potassium in the presence of any of these metals, or of sodium. A patent has been applied for, and the instrument will shortly be put on the market.

New editions have been received of the following works:—Bourne's Insurance Directory, by William Schooling (London: Effingham Wilson). This trustworthy and valuable statement of the positions of insurance companies, and their comparative advantages, should be seen by all who are interested in assurance or actuarial affairs.—"Appearance and Reality: a Metaphysical Essay," by Dr. F. H. Bradley. Second edition. (London: Swan Sonnenschein and Co.). The author describes his work as "a more or less desultory handling of perhaps the chief questions in metaphysics. . . . This volume is meant to be a critical discussion of first principles, and its object is to stimulate inquiry and doubt."—"Les Femmes dans la Science," by A. Rebière. Second enlarged and revised edition. (Paris: Libraire Nony and Co.). The first edition of this book was reviewed in Nature of July 19, 1894 (vol. l. p. 279). Many new names have been added, and some, perhaps, have been inserted without sufficient discrimination; while the information about several of the ladies whose names adorn the pages is often very meagre. The book now includes the names of women who may be termed scientific amateurs, *collaboratrices*, and *protectrices*, as well as of genuine workers. Notwithstanding this, the volume is an interesting monument to the genius of women; and the portraits and autograph letters add to its attractiveness.

The valuable work carried on under the direction of Prof. S. A. Forbes, upon the Illinois River and its dependent waters, has often been noted in these columns. The general object of the biological experiment station of the University of Illinois is to study the forms of life, both animal and vegetable, in all of their stages, of a great river system, as represented in carefully selected localities. How well this object has been attained may be seen from the Biennial Report just received, together with various bulletins of the Illinois State Laboratory of Natural History containing accounts of zoological investigations made at the station. The publications amount in all to some three hundred pages of text, with sixty plates. In one of the papers Dr. C. A. Kofoid describes in detail the methods and apparatus used in "plankton" observations at the station. This term is applied to all plants and animals floating free in water, and incapable by their own efforts of materially changing their position. Prof. Frank Smith has devoted particular attention to a study of oligochæte worms (earthworms and their allies) found in and about the Illinois River and other waters near Havana. The collections made comprise about thirty species, several of which are new. A full report upon the Oligochæta is in preparation. In a valuable contribution, Mr. C. A. Hart gives an account of observations of the insect fauna of the Illinois River and adjoining waters; his paper fills one hundred and twenty-five pages, and, as an example of work done during the first year of the station's establishment, it is very creditable. Mr. Adolph Hempel describes new species of Rotifera and Protozoa. About ninety species of Rotifera and eighty species of Protozoa have been collected upon the Illinois River. Among the Rotifera there are three presumably hitherto undescribed species of the genus Brachionus. From the papers we have named, it will be evident that the Biological Experiment Station of the University of Illinois has more than justified its existence. If evidence is needed in support of the scheme for the establishment of freshwater biological stations in Great Britain, it will be found in the papers to which reference has been made.

The reaction of ferric chloride, potassium chlorate and hydrochloric acid, has been carefully investigated by Messrs. Noyes and Wason, whose results are published in the current number of the *Zeitschrift für physikalische Chemie*. The change is of special interest, because it is the first satisfactory case of a reaction of the third order in which three different substances are concerned. Hood had previously stated that in presence of excess of acid the reaction is of the second order, its velocity being proportional to the product of the concentrations of the ferrous chloride and of the potassium chlorate. When the concentration of the hydrochloric acid is varied it is seen, however, as the authors show, that the reaction is really of the third order, and that its velocity is proportional to the product of the concentrations of all three substances. Without making assumptions, the truth of which cannot at present be verified, it is impossible to represent the reaction by means of a chemical equation, in which the change takes place between three molecules only. Like many other reactions, it is of a lower order than would be the case if the order were determined by the number of molecules represented by the chemical equation as taking part in it. The cause of this simplicity remains at present unknown. The influence of temperature on the velocity of change is well represented by Van 't Hoff's well-known equation ("Études," p. 115). An increase of temperature from 0° to 10° C. increases the velocity 2·7 times; all other reactions, so far studied, are influenced to much the same extent, the effect of a rise of temperature of 10° being to increase the velocity from 2 to 3·6 times; the average number is 2·8.

THE additions to the Zoological Society's Gardens during the past week include two Californian Quails (*Callipepla californica*, ♂ ♀) from California, presented by Mr. T. M. Howells; a Black-headed Lemur (*Lemur brunneus*), a Madagascar Boa (*Boa madagascariensis*) from Madagascar, a Canarian Pigeon (*Columba laurivora*) from the Canary Islands, deposited; two Black-necked Storks (*Xenorhynchus australis*) from Malacca, two Larger Tree Ducks (*Dendrocygna major*) from India, a Ruddy Sheldrake (*Tadorna casarca*, ♂), four Tufted Ducks (*Fuligula cristata*), European, purchased.

OUR ASTRONOMICAL COLUMN.

MR. ISAAC ROBERTS ON LONG-EXPOSURE PHOTOGRAPHS.—In the current number of *Knowledge*, Mr. Isaac Roberts describes a beautiful photograph of Orion, taken by him with an exposure of seven hours thirty-five minutes, the photograph "depicting very probably the maximum of extent and detail that can be shown by aid of photographic methods." This statement, coming from one so versed in celestial photography, cannot be considered lightly, but must be carefully weighed before judgment be given. The reasons which Dr. Roberts gives for this statement are as follows: (1) The film of the negative is, in consequence of prolonged exposure to the latent sky luminosity, darkened on development to a degree that would obscure faint nebulosity and faint stars. (2) Longer exposures of the plates would not reveal additional details of nebulosity, nor more faint star images. Dr. Roberts goes on to say that, although he has taken all precautions to protect the plates from extraneous light, to photograph only on clear evenings, &c., yet the longer the exposure the darker the film becomes in the development of the images. The sequence, he states further, has been observed for many years on all very sensitive films which have had long exposure, and the results have been practically invariable. An important point, favouring Dr. Roberts' statement, is that the unexposed margins of the films do not undergo this process of being darkened, but remain perfectly clear. The point raised by him is one well worth consideration in these days of long exposures; and although the evidence he brings together is strong, yet we hope he has not proved his case.

VANADIUM IN SCANDINAVIAN RUTILE.—For producing the spectrum of titanium, Prof. B. Hasselberg used titanic acid in the form of rutile in the electric arc, finding that it was more suitable than commercial titanium. This rutile came from Krageröe, in Norway, its other chief component, besides titanic acid, being oxide of iron, in a quantity of about 1 or 2 per cent. The spectrum obtained from this substance, after the elimination of known impurities, was thought at first to be pure titanium, but it was found "that among the fainter and faintest lines of my titanium spectrum there are several that doubtless belong to *vanadium*." A re-examination of a large piece of the latter, and subsequent comparison photographs of vanadium and rutile, exhibited many striking similarities. Another kind of rutile was put to the same test. This was Swedish rutile from Käringbricka, in Westmanland, which contained chromium in addition. A comparison photograph of the spectra showed hat the same series of coincidences was found as in the case of the Norwegian rutile, as Prof. Hasselberg shows in the table of his results, given in the *Astrophysical Journal* for March (No. 3). Further spectroscopic experiments suggested that the Swedish variety contained a greater amount of vanadium than the Norwegian; but whether the difference is sufficient to be recognised, or determined quantitatively chemically, remains uncertain.

COLUMBIA UNIVERSITY OBSERVATORY'S PUBLICATIONS.—In the two numbers (10 and 11) of the Contributions of this Observatory, Prof. Harold Jacoby presents two communications on (1) the reduction of stellar photographs with special reference to the Astro-photographic Catalogue plates, and (2) on the permanence of the Rutherfurd photographic plates. The first paper has been written at the request of Dr. Gill, who asked him to put together the formulæ which seemed best for the reduction of the Astro-photographic Catalogue plates. Prof. Jacoby acknowledges the work of others on the subject, and the method he gives is suitable for the reduction of any photographic plates, whether the programme of the Permanent Committee has been adopted or not. The only restrictions are that the centre of the plate must be more than 15° from the pole, and that the plate does not cover more than two square degrees. A description of the method would be too long to give here, so we will confine ourselves to the statement that Prof. Jacoby's formulæ greatly facilitate the computation as a whole. As an illustration of the method of reduction, he gives a fully worked-out example of a plate taken at Paris in 1891, and discussed by M. Prosper Henry. The second communication, dealing with the permanence of the Rutherfurd plates, gives the results of a comparison of the old measures of the Pleiades and those quite recently completed. The object of the investigation was to test the durability of the photographic film, and see whether any deformation, either contraction or expansion, had occurred in the interval since the first measurement, made nearly a quarter of a century ago. The question is one of great importance, since some of Rutherfurd's photographs are still unmeasured; it has, further, a great bearing on the plates of the astro-photographic chart of the heavens. The result of the investigation can be best illustrated by extracting from the final table the figures representing the differences between the old and new measures as obtained from three separate plates. These are as follows:—

Rutherfurd Measures minus New Measures.

Star.	Plate 16.		Plate 18.		Plate 22.	
	Angle.	Dist.	Angle.	Dist.	Angle.	Dist.
A 34	0″·00	−0″·12	−0″·24	−0″·21	+0″·07	+0″·26
18 *m*	− ·06	− ·06	+ ·12	+ ·05	− ·08	− ·34
A 12	− ·01	− ·18	+ ·40	+ ·14	+ ·16	− ·10
A 22	− ·04	+ ·27	− ·06	− ·08	− ·06	+ ·19
A 24	− ·02	+ ·16	·00	+ ·30	− ·13	+ ·10
A 28	+ ·08	− ·10	+ ·18	− ·13	− ·12	− ·13
A 30	− ·02	− ·01	− ·45	+ ·08	+ ·17	− ·01
A 39	+ ·41	+ ·03	+ ·14	− ·18	+ ·39	+ ·02

The conclusions that can be drawn from the whole discussion are that the positions of the individual stars on the plates may be practically determined from either set of measures, the mean error amounting to about 0″·1. Thus the new measures will furnish practically identical results with those that would have been obtained if the plates had been measured twenty years earlier.

A GIFT TO THE PARIS ACADEMY OF SCIENCES.

THE Paris correspondent of the *Times*, writing under date April 5, makes the following announcement:—

M. Berthelot read this afternoon, at the Academy of Sciences, the following letter addressed to him in French by Mr. H. Wilde,